Carbohydrate and Vitamin

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In one group the rats were given diet of several kinds of carbohydrates instead of starch in Table I, and in the other group the rats were given the same kind of diet except that thiamine was not included. The following was the result.

Table I. Composition of Diet for Rat

Basal diet		Salt mixture ¹⁾		Vitamin B ₂ group	
Casein	20%	NaCl	20.2	Riboflavin	40 γ
* Carbohydrate	68	MgSO ₄ ·7H ₂ O	63.5	Pyridoxine	50
Salt mixture ¹⁾	4	K ₂ HPO ₄	11.5	Nicotinic acid	200
Soy-bean oil	5.5	Ca-lactate	28.7	Ca-Pantothenate	200
Cod liver oil	2.5	Na ₂ HPO ₄ ·12H ₂ O	52.6	Choline-HCl	900
		Ca ₂ H ₂ (PO ₄) ₂ ·H ₂ O	111.6	Inositol	180
		Fe-citrate	13.8	B ₁₂	0.024
				The above are made into 0.1 ml. of suspensin.	

The basal diet is given in a larger amount than rats can eat. B₂ group suspension (0.1 ml.) is given orally daily. B₁ is given in the amount of 40 γ (or not given) orally, according to experimental conditions.

* Sucrose	Sorbose
Maltose	Xylose
Glucose	Lactose
Fructose	Mannose

I. Due to hydrolysis by the digestive enzyme, carbohydrates (sucrose, maltose and starch) changed into glucose and fructose, enabling the intestinal canal to absorb them. And the following was the data on the above carbohydrates.

a) Development and food intake of the rats were very good. Blood sugar level, serum protein contents and pattern and hemoglobin value were normal.

b) However, in thiamine deficient rats, each group died in about 4 to 5 weeks showing thiamine deficient symptoms. Up to the time when the thia-

Fig. 1.

mine deficient symptoms, no difference was notice damong these groups which were fed different kind of carbohydrate (sucrose, maltose, starch, glucose and fructose) (Fig. 1).

II. On the monosaccharides (sorbose and xylose), which are found in nature only in very small quantity (as such, the quantity absorbed from daily food is very little) the following noticeable findings were observed.

a) Development and appetite of the rats were disturbed.

Fig. 2.

b) The rats looked healthy but died suddenly in few days. Before death, the blood sugar level fell to about 50 mg%.

c) Serum protein contents, hemoglobin value and red blood cell count showed increases. The authors believe that these increases are due to the concentration of blood.

d) Between this group and thiamine deficient group there were neither differences in the length of their lives nor in the thiamine contents of the internal organs (Fig. 2).

Fig. 3.

III. On the lactose and mannose, the data about between I and II were observed.

a) About half of the rats died in a few days to about two weeks, and another half survived. Of the rats survived, centred around the caecum, ileum and colon were very much enlarged.

b) Even in the thiamine deficient group, thiamine deficient symptoms did not appear and their body weight increased little for over ten weeks. The authors believe that the findings were on account of the thiamine formation due to the change of intestinal bacilli, which was utilized by the rats (Fig. 3).